



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/788,657	02/27/2004	Lei Shao	42P16330X	3606
59796 7590 06/29/2007				
INTEL CORPORATION c/o INTELLEVATE, LLC P.O. BOX 52050 MINNEAPOLIS, MN 55402				
EXAMINER				
MURPHY, RHONDA L				
ART UNIT		PAPER NUMBER		
2616				
MAIL DATE		DELIVERY MODE		
06/29/2007		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/788,657

Applicant(s)

SHAO ET AL.

Examiner

Rhonda Murphy

Art Unit

2616

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 10/17/05.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____.

DETAILED ACTION***Double Patenting***

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claim 1 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of copending Application No.

10/789,387. Although the conflicting claims are not identical, they are not patentably distinct from each other because "receiving content for transmission from a plurality of transmit antennae" (as cited in the instant application), and "receiving content for transmission via a multicarrier wireless communication channel" (as cited in the copending application 10/789,387) is the same. Additionally, "generating a rate-one, space-frequency code matrix from the received content for transmission via the plurality of transmit antennae" is the same as "generating a rate-one, space-frequency code

Art Unit: 2616

matrix from the received content for transmission on the multicarrier wireless communication channel from a plurality of transmit antennae"

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

3. A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

4. Claims 2-22 are provisionally rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 2-22 of copending Application No. 10/789,387. This is a provisional double patenting rejection since the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 101

5. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 8 is rejected under 35 U.S.C. 101 because the claimed limitation is directed towards non-statutory subject matter.

Claim 8 pertains to instructions that are not embodied in any computer-readable medium.

"Similarly, computer programs claimed as computer listings per se, Le., the descriptions or expressions of the programs, are not physical "things." They are neither computer components nor statutory processes, as they are not "acts" being performed. Such claimed computer programs do not define any structural and functional interrelationships between the computer program and other claimed elements of a computer which permit the computer program's functionality to be realized. In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32F.3d at 1583-84, 32 USPQ2d at 1035. See Interim Guidelines on 35 USC 101, Annex IV (a): Functional Descriptive Material.

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

7. Claims 1, 2, 7-10, 15-17 and 22 are rejected under 35 U.S.C. 102(a) as being anticipated by Lee et al. ("A Space-Frequency Transmitter Diversity Technique for OFDM systems", Globecom 2000, IEEE Global Telecommunications Conference; November 27,2000).

Regarding claims 1, 9 and 16, Lee teaches a method, apparatus and system comprising: a number M of omnidirectional antennas (Tx_1 and Tx_2 in fig. 2); and a diversity agent, to receive content for transmission via a multicarrier wireless communication channel ($X(m)$ in fig. 2. It would be inherent to have a receiver to receive the symbol), and to generate a rate-one (equation (1) on pg. 1474), space-frequency code matrix (matrix G_2 on pg. 1474) from the received content for transmission on the multicarrier wireless communication channel from at least a subset of the M omnidirectional antennas antennae (Tx_1 and Tx_2 in fig. 2).

Regarding claims 2, 10 and 17, Lee teaches a method, apparatus and system according to claims 1, 9 and 16, wherein the received content is a vector of input symbols of size $N_c \times 1$ (pg. 1474, right column, first paragraph), wherein N_c is the number of subcarriers of the multicarrier wireless communication channel (equation (1), $X_0(n)-X_{L-1}(n) \dots X_{N-2}(n)-X_{N-1}(n)$ and $X_1(n) \dots X_{N-2}(n)$ are interpreted to be corresponding to the number of subcarriers).

Regarding claims 7, 15 and 22, Lee teaches a method, apparatus and system according to claims 1, 9 and 16, the space-frequency matrix provides $M \times N \times L$ channel diversity (pg. 1477, section V in Lee. Two-branch SF-OFDM transmitter diversity), while preserving a code rate of 1 for any number of transmit antenna(s) M , receive antenna(s) N and channel tap(s) L (pg. 1477, section V. Unity coding rate is interpreted as a code rate of 1).

Regarding claim 8, a storage medium comprising content which, when executed by an accessing communications device causes the communications device to implement a method according to claim 1 would be inherent.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 3, 11 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. ("A Space-Frequency Transmitter Diversity Technique for OFDM systems", Globecom 2000, IEEE Global Telecommunications Conference; November 27,2000) as applied to claims 1, 9 and 16 above, and further in view of Wei (US 5,559,561).

Art Unit: 2616

Regarding claims 3, 11 and 18, Lee teaches a method, apparatus and system according to claims 2, 10 and 17, the diversity agent further comprising: dividing the vector of input symbols (pg. 1474, right column, first paragraph. Data symbol vector $X(n)$) into a number G of groups to generate subgroups (equation (1), $X(n)$ divided into $X1(n)$ and $X2(n)$).

Lee fails to explicitly teach multiplying at least a subset of the subgroups by a constellation rotation precoder to produce a number G of pre-coded vectors (VQ).

However, Wei teaches using a Tomlinson precoder (precoder 17 in fig. 1) which outputs a sequence of values (col. 3 lines 51-54, the sequence is interpreted to be a vector). It is well known in the art that a Tomlinson precoder is a constellation precoder.

Therefore, given the combined teachings of Lee and Wei, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the precoder of Wei into the system of Lee, in order to compensate in advance for forced intersymbol interference (col. 3 lines 47-50).

11. Claims 4-6, 12-14 and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. ("A Space-Frequency Transmitter Diversity Technique for OFDM systems", Globecom 2000, IEEE Global Telecommunications Conference; November 27, 2000) and Wei (US 5,559,561) as applied to claims 3, 11 and 18 above, and further in view of Hottinen et al. (US 2005/0078761 A1).

Regarding claims 4, 12 and 19, Lee teaches a method, apparatus and system according to claims 3, 11 and 18, the diversity agent further comprising: dividing each of

Art Unit: 2616

the pre-coded vectors into a number of $LM \times 1$ subvectors (fig. 2 in Lee, the symbol vector $X(m)$ is divided into $Xl(n)$ and $Xl(n)$ after encoding).

Lee fails to teach creating an $M \times M$ diagonal matrix $D_{sg,k} = \text{diag}[\Theta^{Tm} \times (k-1) + 1SG, \dots, \Theta^{TM} \times kSG]$, where $k=1 \dots L$ from the subvectors.

However, Hottinen teaches creating a diagonal transmission code matrix from transmit diversity code matrices (paragraph 0034). The code matrices Xl and $X2$ are interpreted to be subvectors.

Therefore, given the teaches teachings of Lee and Wei with Hottinen, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the diagonal code matrix of Hottinen into the method of Lee and Wei, in order to increase performance and symbol rate in a wireless mobile system (abstract).

Regarding claims 5, 13 and 20, Lee teaches a method, apparatus and system according to claims 4, 12 and 19, wherein interleaving the L submatrices (pg. 1474, right column, second paragraph. $Xe(n)$ and $Xo(n)$ are interpreted to be the submatrices) from the G groups (pg. 1474, right column, first and second paragraphs. $Xl(n)$ and $X2(n)$ are interpreted to be the groups. Furthermore, $Xe(n)$ and $Xo(n)$ are component vectors of $X(n)$) to generate an $M \times N_c$ space-frequency matrix (matrix $G2$ on pg. 1474).

Regarding claims 6, 14 and 21, Lee teaches a method, apparatus and system according to claims 5, 13 and 20, wherein the space-frequency matrix provides $M N L$ channel diversity (pg. 1477, section V. Two-branch SF-OFDM transmitter diversity), while preserving a code rate of 1 for an number of transmit antenna(s) M , receive

antenna(s) N and channel tap(s) L (pg. 1477, section V. Unity coding rate is interpreted as a code rate of 1).

Conclusion

1. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Pauli et al. (US 2004/0120416 A1)
- Lee et al. (US 2004/0081263 A1).
- El-Gamal et al. (US 7,177,365)
- Walton et al. (US 7,002900).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rhonda Murphy whose telephone number is (571) 272-3185. The examiner can normally be reached on Monday - Friday 9:00 - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on (571) 272-3155. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic

Art Unit: 2616

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Rhonda Murphy
Examiner
Art Unit 2616

RM

Daniel J. Ryman
Patent Examiner
AU 2616

Daniel Ryman